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Management considerations of productivity issues for local government

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MANAGEMENT CONSIDERATIONS OF PRODUCTIVITY ISSUES FOR LOCAL GOVERNMENT

BY

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ABSTRACT

This report examines the issues needed to be addressed by a municipal manager and provides guidelines to follow when establishing a productivity measurement and improvement program. Examined in detail is the relationship of the municipality's quality of service delivery in relationship to productivity. The concerns of productivity in the public sector at the national and local levels are also identified.

Numerous difficulties are encountered when attempting to measure and improve productivity. Many of these difficulties are presented and several are discussed in detail. To overcome the identified difficulties, there are a number of techniques available, some of which are recently emerging.

One of the emerging techniques is a regression based fiscal analysis used to make inter-city productivity comparisons. This technique allows for the introduction of quality measures in the determination of productivity for a municipality. This technique is used in a sample application on several Central Florida cities to determine the relative productivity of the cities.

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PREFACE

The time has come for city managers and elected officials to divert their attention to productivity improvement. Cities are typically facing increasing demands for service, both from their citizens and from an increasing number of federal and state mandated regulations. At the same time, revenue growth is not keeping pace with the demand increase. The elimination of federal revenue sharing, other federal cutbacks and the restricted ability to increase local taxes, because of increased public dissatisfaction, have hampered revenue growth. As a result, cities are faced with the old cliche of "doing more with less." Productivity enhancement will help local government meet the service demands within available revenue.

The public sector impact on the national economy provides an additional motivation to measure and improve public productivity. Total purchases by the federal, state and local governments account for nearly 40% of the gross national product and employment by these governments represents nearly 15% of the nation's work force. However, since public sector productivity has not been measured, its effect upon U.S. productivity is unknown. Looking at

government operations over the past several decades leads one to the conclusion that productivity has obviously increased, but due to the lack of formal measurement the amount of the increase is not known.

There are numerous problems with measuring public sector productivity which perhaps accounts for part of the reason it has not been addressed sooner. The objective of this report is to identify those difficulties and provide guidelines for municipal managers who wish to begin a productivity measurement and improvement program.

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I. WHAT IS PRODUCTIVITY?

There are many and varied answers to this question. The term productivity is used loosely in today's society without a common understanding or definition of the term by the users. In many instances it is used interchangeably with efficiency, while at other times it is associated with a reduction in cost, and still others see it as a measure of production. Despite the ambiguous application of the term, formalized definitions of productivity do exist. In the production arena, productivity is treated as the ratio of the quantity of what is produced to the value of the resources utilized in producing those goods over a defined period of time (Sink 1985, 28-32). This output to input ratio is well established in the private sector as a primary measure of productivity and it is reported routinely by the Bureau of Labor Statistics.

Given this definition of productivity one can see the measurement of productivity involves quantifying the outputs produced, either goods or services, and the inputs or resources used to produce the output. On the input side of the ratio, resources are categorized according to labor, capital, energy or materials. If all of the inputs are included in the ratio, then the measure

of productivity is commonly called total productivity. If, on the other hand, only several factors or a single factor are considered on the input side of the ratio, then the productivity measure is labeled either multi-factor or partial factor, respectively (Edosomwan 1987, 51).

In the case of partial productivity or multi-factor productivity, one must remember that not all inputs are being measured, and therefore there is a danger in over emphasizing one or several inputs and neglecting others. Total productivity therefore presents a more complete picture; however, measuring all of the inputs and properly allocating them to the appropriate outputs is more difficult.

Another recognized measure is total factor productivity, which is a ratio of the net output to the associated labor and capital resources. A problem with the total factor productivity measure is the cost of materials is eliminated from the ratio; therefore, it is not useful when one is trying to identify cost-price effects (Edosomwan 1987, 55).

When measuring the output side of the productivity ratio, one normally assumes that most or all of the outputs are included in the numerator, total factor productivity excepted. In the case of manufacturing, where the output consists of a production of quantifiable goods, this

measurement is fairly straightforward. However, it becomes more difficult when trying to quantify the output of a service organization. This difficulty is particularly true when attempting to identify and measure the output of a municipal government.

Before proceeding with a discussion of these difficulties, it is appropriate to first examine the relationship of efficiency, effectiveness and quality. Efficiency is a description of how well an organization performs in the utilization of its resources. If an organization accomplishes its goals within the budgeted allocation of resources, then the organization is perceived as being efficient. Effectiveness, on the other hand, is the degree to which an organization accomplishes its goals. If an organization delivers the right product in the correct amount and on time, then that organization is considered to be effective. Finally, quality is the degree to which an organization fulfills the valid requirements for specifications of its customers (Sink 1985, 42-44). Quality is related to effectiveness; however, it refers specifically to such items as responsiveness, timeliness, accessibility, availability, safety, reliability and customer satisfaction of the services provided.

A functional relationship of productivity to effectiveness and efficiency can be seen since effectiveness

deals with the output side of the firm and efficiency deals with the input side. The relationship of quality to productivity is more obscure. In the manufacturing environment, it is intuitively logical that higher quality leads to higher productivity. Productivity increases because increased quality results in fewer defects and less rework. There is also greater customer satisfaction with the resultant effect of expanded marketability and higher sales.

In the public sector service organization, however, the relationship between productivity and quality is not always positively correlated. For example, consider a municipality which changes its point of collection for residential refuse from the back door to curbside, in order to serve more residents without increasing the number of collection crews. Under this scenario, productivity as previously defined would increase since the output would increase while resource inputs remain constant. The problem of productivity measurement in this example is obvious in that it does not recognize the drop in the quality of service, nor the input which is now provided by the resident by carrying the refuse to the curbside.

In the case of municipal output, the numerator of the productivity ratio must incorporate both quantity and quality aspects of the municipal services. Input reductions or output increases which are achieved through a

reduction in the quality of service do not reflect true productivity improvements (Ammons 1984, 51).

Additionally, quality of service in a municipal operation is frequently linked to effectiveness since it is often viewed as an important element in the organization's ability to achieve its service objectives. Conversely, it is viewed as a factor tending to work against the municipal budget and hence a reduction in efficiency. Figure 1 illustrates the relative importance of effectiveness, efficiency, quality and productivity as they relate to different types of organizations.

In view of the interrelationships between efficiency, effectiveness and quality, the definition of productivity as applied to the municipal sector tends to be more comprehensive than that previously defined because it includes a measure of quality of service. Nancy S. Hayward has promoted a definition for municipal productivity which combines the standard output-to-input ratio with a measure to account for quality of the service as follows (Hayward 1976, 544):

> Governmental productivity is the efficiency with which resources are consumed in the effective delivery of public services. The definition implies not only quantity, but also quality. It negates the value of efficiency, if the product or service itself lacks value. It relates the value of all resources consumed - human, capital, and technological - to the output of public services or results achieved.

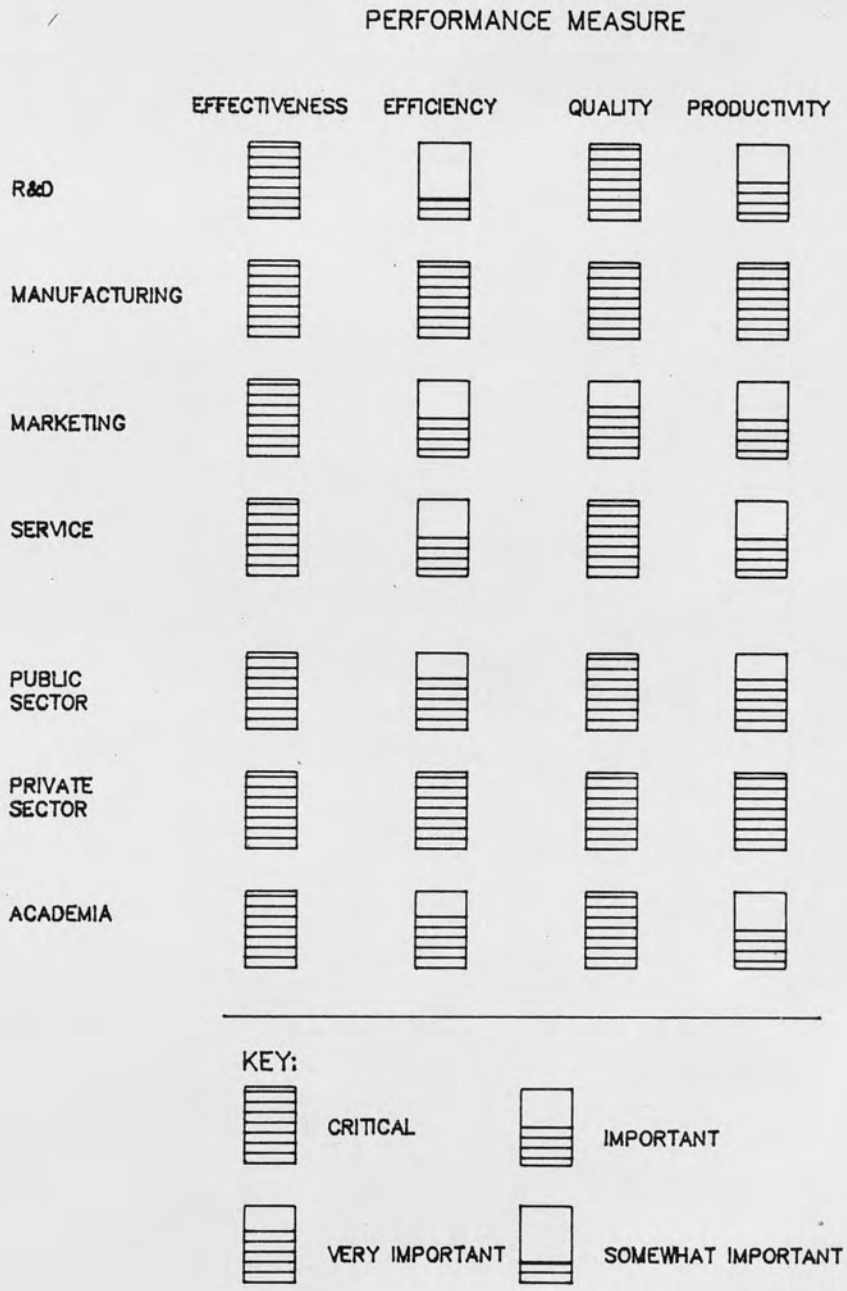

Figure 1. Performance Measures by Function of the Organization.

Source: Scott D. Sink, Productivity Management: Measurement and Evaluation, Control and Improvement, New York: John Wiley & Sons, lnc., 1985, p. 48.

Using this definition, the productivity measure must also include quality as well as quantity in order to determine real productivity gains. Take for example the scenario of refuse collection. A standard productivity ratio of output to input would be the tons collected versus the cost of collection as measured by labor hours and equipment expenses. Based on the above definition this ratio should be modified to include quality indicators such as the point of collection, frequency of collection and population density of the collection route.

II. CONCERNS OF PRODUCTIVITY IN THE PUBLIC SECTOR

There are two basic motivations to measure productivity in the public sector. First, there is a need for productivity information in the public sector as it relates to the national economy. The rate of productivity growth in the United States has been decreasing over the years. Between 1948 to 1965, the average yearly productivity increase was 3.2%. However, from 1965 to 1973 the rate of growth dropped to 2.4%. Between 1973 to 1978, the rate of growth dropped even further to 1.1% and in 1979 the average worker was only 98% as productive as in the previous year (McGowan 1984). Productivity continued to decline in 1980, but since then it has turned around and has rebound during the remainder of the 1980s. These figures exclude state and local governmental purchases which comprise approximately 15% of the gross national product, while federal expenditures represent another 22.5%. Furthermore, employment by the federal, state and local governments accounts for more than 14% of the nation's work force (Keane 1980). Since there are no over-all data on government productivity, its effect on the U.S. productivity is unknown; however, hypothetical estimates of government productivity effects on the national

TABLE 1

EFFECT ON THE NATIONAL RATE OF PRODUCTIVITY GROWTH FROM VARIOUS ASSUMED RATES OF PRODUCTIVITY GROWTH IN THE OMITTED GOVERNMENT SECTOR

AVERAGE ANNUAL RATE OF PRODUCTIVITY IMPROVEMENT IN PRIVATE SECTOR	ASSUMED RATE OF IMPROVEMENTS IN OMITTED SECTORS OF GOVERNMENT	IMPLIED RATE OF TOTAL ECONOMY
3.0%	0.0%	2.5%
3.0%	1.0%	2.7%
3.0%	2.0%	2.8%
3.0%	3.0%	3.0%
3.0%	4.0%	3.2%

Source: Brian Usilaner and Edwin Soniat, "Productivity Measurement," In Productivity Improvement Handbook for State & Local Government, p. 95. Edited by George F. Washnis, New York: John Wiley & Sons, Inc., 1980.

productivity has been estimated by Jerome Mark of the Bureau of Labor Statistics as shown in Table 1.

The other motivation for measuring governmental productivity is the need at the local level for this information. Since the mid 1970s, municipalities, in general, have been faced with dwindling resources due to cutbacks in federal programs and also increased public dissatisfaction with local taxes. At the same time, the public is expecting more services for their tax dollar. In this setting, it is important to know and understand why

some cities appear to be better in providing services. Some of the variation is undoubtedly due to differences in the service provision; however, there is much the cities can do within their fiscal constraints to improve.

The pressure on municipal management to cope with the crunch of demands and dwindling resources is not the only reason for establishing productivity measurement and improvement efforts. Overall, the public has a low regard for governmental performance. A poll in 1976 conducted by Lou Harris revealed that the public rated government workers as the least productive of all categories. When asked which workers had above average productivity, the government workers were ranked next to the last (Keane 1980). There is, however, no conclusive evidence for the harsh judgment of local government for low productivity. A research effort by the Urban Institute found that there was little factual data available to demonstrate low levels of productivity in local governments, or to indicate whether it has been increasing or decreasing and at what rates. Rising costs and increased urban problems would suggest that productivity is falling; however, there are no solid facts to substantiate this conclusion (Ammons 1984, 12). Cost increases which exceed the inflation rate may be attributable to service expansion or increased service quality rather than the reduction in productivity.

Figure 2 illustrates several additional reasons for measuring productivity in the municipal field.

When viewed over the past century, it is quite evident that government productivity has increased; however, it is not evident if it is keeping pace with the private sector. An accurate summary statement of government productivity has likened it unto the Lock Ness Monster, in that there has been numerous sightings, but no substantiation of its existence (Ammons 1984, 1).

The perceived discrepancy between private and public productivity may be due in part to the environments in which the two sectors operate. Service delivery in the public sector is influenced substantially by local politics and special interest forces and the time horizon for elected officials is usually only a few years. Furthermore, there is often a high turnover of top agency officials in the public sector as compared to the private sector. Conversely, when considering the rank and file in the public sector, the civil service system has severely limited administrative flexibility and reduced employee motivation.

There is a lack of measurability of the public sector service. Due to its monopolistic nature, there is no market test to serve as an outside control, and therefore it is unknown if the consumer is getting a fair product for

To encourage the kinds of comparisons and public scrutiny that lead to better value to citizens from their local governments;

To provide an index of progress -or lack of progress- to individual local governments;

To develop standards of performance, based on aggregate data for similar communities;

To dramatize diversity and thus generate effort to determine the reasons for success and whether these reasons can be used more widely to treat the causes of poor showing;

To serve as a basis for performance incentives that can be used by government management and labor in wage and working condition establishment;

To guide the federal government in allocating resources to raise the level of performance throughout the nation.

Figure 2. Reasons for Municipal Productivity Measurement.

Source: David N. Ammons, Municipal Productivity: A Comparison of Fourteen High - Quality - Service Cities, New York: Praeger Publishers, 1984, p. 94.

the money spent. The non-exclusionary nature of public goods and services makes it difficult to determine the number of people serviced or even the demand for the service. There is also an uncertain relationship between some work load measures and work results as relates to productivity. For example, it is not possible to accurately identify the number of crimes prevented by increasing police patrols. Moreover, there is an

intangible nature of many of the benefits provided by local government, such as for preserving the "quality of life" for the community (Ammons 1984, 91).

The absence of competition is a common theme at attempting to explain poor performance in the public sector. A few cities have recognized this shortcoming and have purposely created a competitive environment for delivery of some services. Advantages received by such actions include decreased vulnerability to employee actions and to contractor failures, and a protection against the monopolistic behavior of contractors and municipal employees. A dual yardstick for measuring and comparing performances is created as managers become more knowledgeable and understanding of service delivery (Ammons 1984, 17).

There are also philosophical differences and attitudes between the public and private sectors. In the private sector, corporate growth is viewed as positive; but in the public sector, government expansion is generally not agreeable to the public. Moreover, the consumer encourages competition among its producers; however, competition among public agencies is generally viewed as a duplication of services (Ammons 1984, 16).

Productivity improvement has been identified to occur through process factors, product factors, and personnel

factors. In the private sector, productivity gains have focused primarily on the process factors because of the capital intensive nature of industry, but in the public sector arena, productivity improvements must focus on the personnel factors due to the labor intensive nature of the organization (Ammons 1984, 18).

III. MUNICIPAL PRODUCTIVITY DIFFICULTIES AND MANAGERIAL GUIDELINES

Difficulties

In the first two chapters of this report, occasional inferences were made to problems of measuring productivity in local government. Indeed, there are numerous problems encountered when attempting to measure local government productivity. This chapter will enumerate many of these problems, with emphasis on the major ones. The chapter will conclude by presenting guidelines for management consideration when embarking upon a productivity measurement and improvement program.

Jesse Burkhead and Patrick Hennigan identified five factors that make it difficult to measure public sector productivity:

1) Absence of discrete units of output
2) Absence of a clearly defined production function
3) Presence of multiple and sometimes competing objectives
4) Presence of reciprocal externalities
5) Absence of an adequate database. (Ammons 1984, 9)

First, there is an absence of distinct units of public sector output. The services offered by local government are many and vary widely from jurisdiction to jurisdiction. Furthermore, the reporting and cost accounting of services provided are frequently not in a format to readily make comparisons. Second, there does not exist a clearly specified production function which expresses the value of inputs to the value of outputs. Third, municipal objectives are many, and are often competing or conflicting in nature. For example, the objective to increase efficiency may be at odds with an objective to provide a guicker response to a citizen's request for service. Fourth, often one department's output is dependent upon input from another department. Finally there is not an adequate database which provides a common measure of local government activities.

David Ammons has identified thirty-seven separate yet related barriers to productivity improvement in local government which are listed in Table 2. The reader is referred to Ammons, 1984 and 1985 for further information.

The most significant problem in determining public sector productivity lies in the difficulty of measuring and reporting local government outputs in terms of quality and scope which can be used on a comparative basis inter-jurisdictionally. The refuse collection example

TABLE 2

THIRTY-SEVEN COMMON BARRIERS TO PRODUCTIVITY IMPROVEMENT IN LOCAL GOVERNMENT

* political factors that influence decision making
* productivity improvement's lack of political appeal
* short time horizon of politicians and top executives
* policy rather than performance emphasis in local affairs
* public perceptions regarding changes and benefits
* fragmentation of local government
* inadequate research, development, and experimentation
* anti-productivity effect of federal grant provisions
* intergovernmental mandating of local expenditures
* civil service restrictions
* legal restrictions to motivational programs
* barriers to monetary incentive plans
* dominant preference for the status quo
* absence of market pressures
* perceived threat to job security
* union resistance
* bureaucratic socialization processes
* primary emphasis on effectiveness rather than efficiency
* lack of accountability
* risk avoidance
* perverse reward systems
* absence of personal rewards for innovation and productivity
* conceptual confusion
* managerial alibis
* inadequate management commitment to productivity
* reluctance to abandon
* ambiguous objectives and lack of performance measurement
* absence of cost accounting systems
* inadequate information on intracity and intercity performance
* inadequate information dissemination and reluctance to use what is known
* inadequate performance evaluation
* insufficient analytic skills or analytic staffing
* performance myths
* requirement of large initial investment for productivity efforts
* overselling productivity improvement program
* bureaucratic rigidities and fragmented authority
* supervisory resistance

Source: David N. Ammons, "Common Barriers to Productivity Improvement in Local Government," Public Productivity Review, Winter 1985, p. 295.

cited in Chapter 1 provides a brief exposure to this particular problem. As a result, the restricted number of productivity measures in the public sector has been primarily limited to intra-organizational comparisons over a period of time due to inter-organizational measurement difficulties. Some of these difficulties have been identified by Hatry and Fisk wherein they noted that several functions of local government are largely ignored such as solid waste collection and fire protection (Ammons 1984, 96-97). Also, reports which are solicited are voluntary and jurisdictions do not always respond. For instance, the FBI has worked many years to have police departments provide crime statistics, but this is not always successful. Also, the output data is not related to the input data; and furthermore, the comparability of the data is poor because there is a wide variety of definitions and collection procedures by local governments. Finally, the data are typically not available for several years after the event and the data that are available have been aggregated so that the individual identity has been lost.

A common measure which has been used to try to correlate inter-organizational productivity is per capita expenditure comparisons. The problem with this comparison is the output measurements are usually ignored completely and the tabulations frequently include cities with

significantly different mixes of service quality which goes unidentified (Ammons 1984, 98-100). Per capita expenditure comparisons are also subject to the problems of measurement on the input side due to the self imposed need by the municipality for consistency in reporting expenditures and capital depreciation. Even given cities of the same characteristics and quality of service, the per capita expenditure comparison can be used only for distinctions in expenditure patterns. Per capita expenditures in this case are still inadequate for purposes of comparing the relative efficiency or performance of local governments.

There is a new approach to inter-governmental productivity comparison which has been proposed by David Ammons and subsequently advanced by David Folz and William Lyons (Ammons 1984, 104-105 and Folz and Lyons 1986). Their procedure involves a fiscal analysis by the use of a regression model, using explanatory variables relating to population, salary indices and quality indicator factors to estimate the budgetary expenditures in the delivery of services. The estimate is used in turn to develop a relative productivity index comparing estimated expenditures to actual expenditures. This new methodology will be examined in further detail in Chapter V.

Managerial Guidelines

The American Productivity Center has been involved in productivity improvement efforts for several years. Their exposure to these efforts has identified a pattern of pitfalls and errors that have taken shape from hastily devised productivity improvement efforts (McClure 1986). Review of those mistakes leads to the following considerations for managers when implementing a productivity measurement and improvement effort.

Before embarking on an improvement program, the manager should first assess the current attitudes and awareness of the organization in relation to productivity. A clear rationale for the reasons to improve productivity must be developed and communicated to all levels of the organization. The improvement effort should provide for extensive employee involvement rather than management dictum. Unless there is an open and trusting relationship within the organization and motives and ideas are communicated thoroughly, middle managers will feel threatened and employees will resist the efforts. In short, the entire culture of the organization must be assessed and addressed.

Managers should not treat the improvement effort as a project. Productivity improvement should be an ongoing and continuing effort, whereas a project by its definition has

a definite beginning and end. An individual should be placed in charge of the management effort and this individual needs to be made a part of the permanent management team; however, this should not be construed to mean simply appointing a productivity coordinator. The individual in charge should have access to staff, the necessary resources and the requisite authority to carry out the effort. At the same time, the manager must demonstrate solid support and commitment from the top. This is not to say that the manager needs to make the productivity improvement effort a pet program, but the efforts may quickly subside, absent periodic and thorough demonstration of support from the chief officer.

The manager should not get hung up on the measurement issue. Measurement is necessary of course; however, the goal is to improve productivity. In developing measures, employees should be contacted for their input since employee participation greatly enhances implementation. Furthermore, the customers of the organization should be queried as to their expectations. Finally, the measurements should take into consideration current record keeping and accounting practices and, moreover, should not try to measure everything. Recall Pareto's principal which allows that 80% of the expenditures will be accounted for by 20% of all activity.

The manager must be cautious to avoid relying on a new technique to provide the answers to productivity improvement. There are many programs available which improve productivity; however, the manager must understand that some techniques are better than others for a particular organization and the timing and administration of the technique are also important. Several productivity improvement techniques are discussed in the next chapter.

Furthermore, before embarking on new techniques, a manager should look thoroughly at the basics of the organization for its ability and commitment to produce. This requires a close look at the human resource productivity area, to determine if the ability to perform is present. In recent years, concern over equal employment opportunity and problems associated with such things as testing validation and minority quotas have reduced the emphasis on worker ability. The manager should ensure that the appropriate training is available to employees for professional growth and development, and that goal setting and feedback processes are in place to prove the commitment to be productive. A key indicator of a deficiency in employee ability and commitment is the rate of absenteeism and turnover in the organization (Hinrichs 1983). Research indicates that employee motivation is the key element for

sustained productivity improvement, whereas reports on other techniques have had mixed results (Ammons 1984, 37).

Finally, the manager should consider the structure of the organization and the related productivity improvement effort. This effort may be completely centralized in a single productivity staff, or it may be decentralized throughout the organization by departments (Hayes 1980). In a highly centralized structure, a single entity is responsible for the analysis of the operational activities and the establishment and implementation of productivity improvement goals. A centralized information system, which monitors and processes all productivity improvement related information, provides for better control, a clear chain of command, a reduction in overlapping data collection and better data sharing.

A decentralized structure also has advantages. It tends to decrease tensions on the operating personnel, and it promotes a closer linkage between the analysis and the operations, and some inefficiency in management congestion is avoided. Another possible structural approach is non-directive in nature, wherein the management of the organization simply picks the opportunities for productivity improvement using the respective managers who are involved.

Robert McGowan has developed a somewhat different perspective for dealing with productivity improvement in local government (McGowan 1984). McGowan argues that there are both internal and external environments which affect productivity efforts of local governments. McGowan continues by stating the municipal organization consists of three levels. Different strategies are called for in responding to the internal or external environmental forces affecting productivity as relates to each level.

The operational level of the organization frequently consists of those activities which are often routine and standardized and performed on a continual basis. The next level of the organization represents the coordinative work functions where the emphasis is on managerial activities ranging from monitoring the progress of particular programs to allocating budget and personnel resources. The coordinative tasks differ from the operating tasks in that they are periodic rather than routine and are often not subject to established procedures. The strategic level is the final subsystem of the organization and is perhaps the most critical for municipalities today. The tasks of this level are the most ill-defined but they tend to balance external demands with internal responses, which involves adapting to changes in the environment.

Most efforts in productivity improvement have focused on the internal dimensions of work activities and the processes established by engineered work standards or quality control procedures. These efforts are directed at the operational level of the organization. McGowan's research, however, indicates a new strategy for productivity in the municipal organization. He discovered a high correlation between internal actions at the strategic level of the organization and outside environmental forces. These correlations are exhibited in Table 3.

From these relationships, McGowan has drawn several implications for municipal managers to follow in order to improve productivity. Managers should view the process of improving service delivery and productivity in the broader light. The organization's efforts to improve productivity are affected in the long run by developments which take place outside of the organization. Therefore, managers should begin to set goals and objectives for service delivery in their long-range planning process. Many organizations may do this on an informal or intuitive basis, but McGowan argues that it should become an explicit effort to define the organization's future domain and plan for it accordingly.

TABLE 3

CORRELATIONS FOR INTERNAL ACTIONS AND EXTERNAL FORCES

INTERNAL ACTIONS	EXTERNAL FORCES				
STRATEGIC	DEMAND FOR SRVS.	FINANC'L STRESS	POP. DECLINE	REDUCED BUSINESS	POLITICAL CULTURE
limit union demands	.16*	.13	-.13	.05	.15
cut human services	.40***	.34***	.30***	.39***	.23**
cut police & fire services	.36***	.24**	.23**	.22**	.16*
reduce capital expenditures	.32***	.40***	.21**	.37***	.26**
increase taxes	.21**	.24**	.18*	.04	.03
across-the-board cuts	.29***	.28***	.29***	.31***	.17*
dramatic cuts	.40***	.40***	.36***	.42***	.21**
cooperate w/ jurisdiction	.04	.10	-.12	-.09	-.07
COORDINATIVE/OPERATIONAL					
adv. tech.	.04	.04	.12	.01	-.03
strong acctng.	.05	.18*	.03	.11	.05
contract out	.17*	.04	.11	.20*	.01
program budget	.01	-.15*	-.11	-.05	-.04
studies	.16*	.07	.15*	.07	.21*

n=85 jurisdictions, p=probability that statistical measure, Kendall's tau, is less than listed level of significance.
*p less than .05 **p less than .01 ***p less than.001

Source: Robert P. McGowan, "Strategies for Productivity Improvement in Local Government," Public Productivity Review, Winter 1984, p. 326.

Next, the manager must ensure that the long-range plans will be fully implemented in the coordinative and operating levels of the organization. This means that the organization must be provided with the necessary tools and technologies to follow through on these strategic plans. Finally, the manager must ensure that the individual component is not overlooked. The ability of the manager to channel the strategic and coordinative decisions toward productivity improvement is contingent upon the human resource talent of the organization. In this regard, managers must devote closer attention and provide recognition to individuals so that they are motivated to achieve the goals of the organization. The manager must realize that in order to improve productivity, a change of the organization's status quo is necessary and all personnel within the organization must be committed to the effort.

IV. PRODUCTIVITY IMPROVEMENT TECHNIQUES

This chapter will examine productivity improvement techniques which managers may find useful in the execution of a productivity improvement program. Some of the techniques presented are traditional while others are more innovative. The reader is cautioned that while these techniques have worked, the manager must not look to them as a panacea in solving productivity problems. Each organization is unique and the suitability of the techniques must be investigated before they are used.

Traditionally, industrial engineering methods have been used in the manufacturing area for many years to enhance productivity. Some of these methods such as operations review, work measurement and work standards are applicable in the municipal government sector for certain types of services provided (Aristigueta 1986). Operations review identifies work activity elements and develops flow charts in order to track the work distribution and the processes of the organizational unit. Staff can be taught the charting techniques in a short period of time and the results often point to the need for modifications in the work process or layout. Work measurement evaluates the

operations of the organizational unit in terms of the cost of providing services. These work measurement techniques include time study, standard data, predetermined time systems, historical estimates, technical estimates and work sampling. The data collected from work measurement is utilized to develop work standards for the amount of time required to complete a specific task (ICMA Report 1974).

There are new productivity improvement techniques emerging and in practice to varying degrees. Several of these techniques include:

1) Organizational Structure Analysis

2) Financial Techniques
   - Lease-Purchase
   - Total Cost Purchase
   - Capital Budgeting

3) Employee Involvement
   - Quality Circles
   - Gain Sharing
   - Task Force

4) Brain Skill Management.

The structure of the organization itself should be looked at to identify how well it enables the employees to accomplish the goals of the organization. Obvious considerations include the span of managerial control and the number of management levels; however, the cost of management relative to the rank and file payroll should also be reviewed (Hendrick 1986). To better display organizational efficiency and structure, the standard

organizational chart may be replaced with the chart as illustrated in Figure 3. This chart, called a house plot, depicts reporting relationships and structural data. It shows the important features of the organization such as the number of levels of management, the ratios of managers to workers, the cost to manage each dollar of worker payroll and the percent of middle managers in relation to the total number of managers. Also depicted are the one-on-one relationships between managers (such as between Webber and Ross), the number of overstretched managers (triangles), and understretched managers (circles). The other ratio shows the percent of time spent managing in the numerator as compared to the percent of supervision performed by non-supervisory staff in the denominator. The use of such a statistical chart provides management with a fresh look at the structure and will provide a useful tool for an in-depth analysis should restructuring be necessary.

In a related situation, organizations may lose productivity improvement potential by promoting strong technicians to managers in order to put them at a higher salary grade. This results in the loss of a good technician and the gain of a poor manager. A more productive alternative would be to establish a proper salary scale to compensate the strong technician.

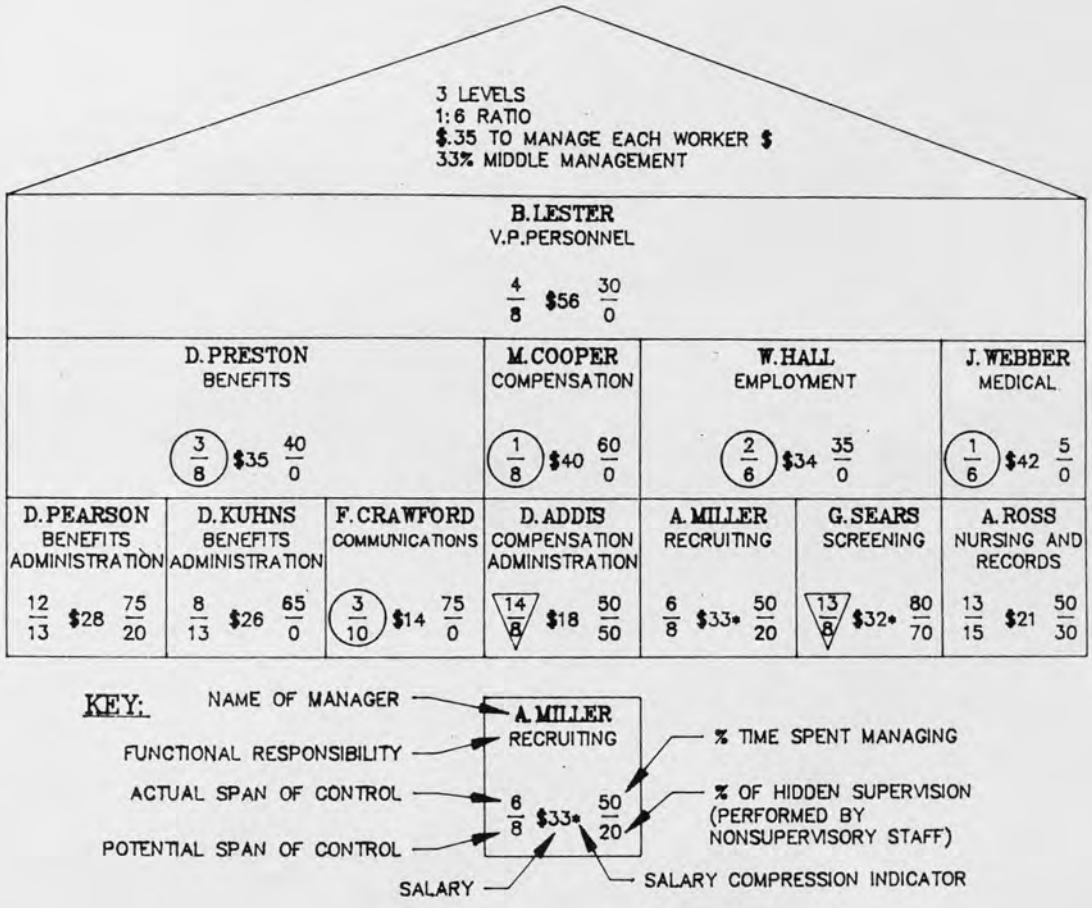

Figure 3. Example of a Data Based Organizational Chart.

Source: Gregory Hendricks, "Organizational Structure: The Source of Low Productivity," In Productivity Improvement Techniques: Creative Approaches for Local Government, pp. 24-28. International City Management Association. Washington, DC: By the Association, 1120 G Street, 1986.

Certain financing techniques are also being employed in order to improve productivity. One technique is the use of the lease/purchase agreement for capital projects. A municipal lease does not increase the local government's debt and therefore its bonding capacity will remain unaffected. The interest rates for a municipal lease are comparable to a tax free bond issue, since interest income from a municipal lease is tax free in most instances. Additionally, a lease incurs substantially less closing cost than does a bond and the transaction can be made in a much shorter period of time (MacLean 1987). The life cycle costing/purchasing technique is also conducive to capital productivity improvements since the analysis includes the total of acquisition and operating cost. This provides justification for the acquisition of a more expensive asset having the lowest annual cost. Another financing technique includes the use of capital project planning and budgeting in order to set forth the financing requirements beyond the normal annual budget cycle. Increasing user fees and the creation of charges for city facility use is becoming more prevalent in order to eliminate the taxpayer subsidy when special beneficiaries can be identified (Kemp 1986).

Perhaps the most emergent and used productivity improvement technique is that of employee involvement. The

use of quality circles has proven to be of significant value in increasing employee morale, enriching the employee's job and increasing quality, productivity and motivation by making use of the employee's knowledge. Another employee involvement technique is that of gainsharing. Under this system the rewards of cost savings are shared with the employee under predescribed conditions and formulas (Mercer 1985).

A related form of employee involvement but applied more to management, is the use of a task force. These are management teams, formed and appointed by the local government directors for a specific purpose and for a finite period of time. Task forces seem to be more effective in improving productivity, quality and morale for management personnel whereas non-managerial employees prefer quality circles and gainsharing.

Creativity and innovation have been demonstrated to be linked to productivity enhancements. This improvement approach has until recently been ignored or at least not utilized; however, one technique has been used which provides for the management of brain skills to increase productivity (Agor 1986). Under this technique, the organization attempts to identify individual brain skills and match them to the organizational needs regardless of the person's title or function within the organization.

Brain skills of the individual or group are identified through diagnostic testings such as the Myers-Briggs Type Indicator (MBTI) test. The MBTI classifies individuals into sixteen basic types which can then be grouped into three brain skills of intuitive, analytical or integrative as shown in Figure 4.

This brain skills management technique has been used by the City of Phoenix for problem solving. First, managers with high scores in the intuitive brain skills are brought together into a group, cutting across normal departmental lines to develop a list of possible solutions to the problem. The intuitive or "right brain" managers tend to be more creative and therefore tend to facilitate the generation of new solutions to problems that appeared before to be unsolvable. The second step in the problem solving process is to have the list of potential solutions reviewed by analytical or "left brain" managers. These managers tend to be more analytical and critical and they are skilled in assessing the practicality and relevant facts of the proposed solutions by the other group. The final step in the process is to integrate the previous two groups of managers at a third meeting. This meeting is chaired by a manager who scored high in integrative brain skills and this manager is therefore best suited to see the value of the alternative proposals suggested and to use

STEPS IN PROCESS	BRAIN SKILL	MANAGEMENT CAPABILITY
First	Intuitive	Sees new possibilities, insightful, enthusiastic and personal
Second	Analytical	Sees facts, practical and impersonal
Third	Integrative	Fashions a plan of action integrating possibilities with facts and practical necessities

Figure 4. Solving Problems Guided by Brain Skill Assessment.

Source: Weston H. Agor, "Managing Brain Skills to Increase Productivity," In Productivity Improvement Techniques: Creative Approaches for Local Government, pp. 111-120.

elements of each to form a practical plan of action which can be implemented. One note of caution in regard to this technique is that it must remain sensitive to legal and ethical issues.

The foregoing approaches have been used by local governments for productivity improvement; however, the effectiveness of many of the approaches has had mixed results. Nevertheless, the availability of existing data suggests that motivation of employees is the most important element for sustained productivity improvement (Ammons 1984, 37).

V. INTER-CITY PRODUCTIVITY COMPARISONS

As described in previous chapters of this paper, both the scope and quality of a municipality's services are important factors in studying productivity. They are both aspects of the local government output and they may both be expected to influence the resource requirements. The quality of the service delivery includes tangibles such as the convenience and responsiveness to the customer, while the non-exclusionary nature of public services and the existence of competing and sometimes conflicting service objectives affect the scope of municipal services. This unique relationship between quality and scope account for many of the difficulties encountered in attempting to measure and improve local government productivity.

With these difficulties, various types of workload and productivity measures have been developed by individual managers to measure the performance of their organization. While such efforts are commendable and should be practiced, they only provide the manager with a self comparison analysis, i.e., the manager can only compare the productivity of the organization of the current period of time to some previous period of time.

There is a strong need for managers to be able to compare their productivity efforts to those of other managers and to be able to identify what characteristics or management styles are successful in improving productivity. However, the variable mix in quality of services provided by different municipalities coupled with the scarcity of data on municipal performance and the lack of common measures, makes inter-organizational productivity assessment even more difficult than for intra-organizational measurement.

The problem with inter-organizational measurements has lead to the development of a number of different indices which are used for comparative purposes. Some of the more common ratios are police officers per capita, library books per capita, and municipal service expenditures per assessed value of property. However, these indices are woefully inadequate since they represent nothing more than resource utilization and do not address, in any manner, quality nor effectiveness of the service and delivery (Ammons 1984, 87).

In an effort to overcome these inter-organizational productivity comparison problems and to provide municipal managers with a meaningful tool in comparing inter-city productivity, David Ammons has developed a regression based mathematical model (Ammons 1984, 104-117). The methodology

used by Ammons was to identify a group of cities that had comparable service qualities for seven functions, thereby minimizing the difficulty of accounting for quality of service differences in the inter-city comparison. Regression analysis was then used to identify the relationship between the dependent variable and several independent or explanatory variables. The final mathematical equation can then be used to compare ranges in the dependent variable given different values of the explanatory variables. Ammons chose the expenditures on a service as a function of the workload and cost of providing the service. Expenditures may represent either expenditures for a particular service area or for a group of several different services in the aggregate form. The workload was represented by the population of the municipality and cost was represented by the entry level salaries of several municipal jobs.

To represent the economies of scale, which would theoretically be realized between the expenditure and the workload with increasing population, Ammons modified the functional form of the model to demonstrate a curvilinear relationship between these variables. Shown below are the functional form and the general regression form:

$E = f(W, W^2, W^3, C)$ Functional Form

$E = a + b_1 W + b_2 W^2 + b_3 W^3 + b_4 C$ General Form

where E is the predicted expenditure, a represents the intercept, W represents the workload defined as the municipal population, C is the cost index, and b_1, b_2, b_3, b_4 are the coefficients of the independent variables. The cost index, C, represents the average of starting salaries for the positions of police officer, fire fighter and clerk typist.

As stated earlier, Ammons selected a group of cities which had similar quality of service standards for seven identified municipal services. These services and the associated quality of service standard are shown in Table 4. The cities selected for the analysis had to have satisfied at least six of the seven criteria. Fourteen such cities were identified and included in the analysis. Data representing the values of the dependent and independent variables were obtained for each of the fourteen municipalities and fitted using a multiple regression approach. In the regression analysis, individual analyses were performed on each of the selected functions; however, in assessing overall relative productivity levels, a regression analysis was performed on the aggregate expenditures for all of the selected services. Ammons' final regression equation for the fourteen cities is as follows:

$$E = -2{,}307{,}500 + \underset{(1.120)}{62.699W} + \underset{(1.771)}{(7.6395W^2 \times 10^{-4})} - \underset{(-1.696)}{(1.414W)^3 \times 10^{-9}} + \underset{(1.349)}{460.12C}$$

TABLE 4

HIGH-QUALITY MUNICIPAL SERVICE STANDARDS

FUNCTION	STANDARD
Police	Less than national average rate of motor vehicle thefts (1979: 498.5 thefts per 100,000 population)
Fire	Public protection classification of 4 or better (ISO class or equivalent)
Refuse Collection	Twice/week backdoor residential collection
Streets	Pavement and curb index of 80% or greater $\text{Index} = \frac{2A + B}{3}$ Where A = percentage of streets that are paved and B = percentage of residential streets with curbs
Library	Per capital circulation of 4.5 or greater
Parks and Recreation	At least one lighted municipal tennis court per 5,000 population
Financial Administration	Recipient of Municipal Finance Officers Association (MFOA) Certificate of Conformance for Financial Reporting

Source: David N. Ammons, Municipal Productivity: A Comparison of Fourteen High - Quality - Service Cities, New York: Praeger Publishers, 1984, p. 73.

where E represents the estimated expenditure for the service functions, W is the workload represented by the 1980 population and C is the cost represented by the salary index for each city.

The above regression equation had an R squared value of .988. The t statistics are shown below the parameter estimates. These values indicate the significance of regression parameters are questionable, and therefore substantially weakens the model. For the present, this weakness will be set aside and addressed in the following chapter.

To provide for inter-city comparisons of the relative productivities, Ammons developed a Relative Productivity Index as defined by the following equation:

$$P_i = -1(R_i/F_i)$$

P_i is the relative productivity index score for a particular city, F_i is the estimated expenditure for the service functions obtained by the regression equation and R_i is the residual for the city, representing the difference between the actual expenditure of the city on the service functions from the estimated value. The -1 term is used to create a positive index since a negative residual results when the actual expenditure is less than the estimated expenditure, indicating greater than average productivity.

As stated previously, Ammons restricted the comparison to cities which had a comparable match of service mix and service quality. This condition, however, restricts the applicability of utilizing Ammons' regression equation for cities outside of this particular service scope and quality match. Additional research has been performed by David Folz to further explore the possibility of developing a model to compare cities of differing qualities of service delivery (Folz 1985). Folz's methodology adopted the same relative productivity index as originally defined by Ammons; however, his regression equation was modified to include a service quality variable as one of the explanatory variables. The service quality indicator was similar to the methodology used by Ammons, in that Folz used six service functions to define the service mix; however, the quality of service was modified to include a relative service quality index.

This index provides a method for scoring the service quality of cities based on measures for each of the six services used in the analysis. The index is designed so that each of the six services has a mean value of 100 points and a maximum possible value of 200 points. This index allows a quantitative measure of the variations in service quality provided by the various municipalities.

Table 5 illustrates the municipal functions and the associated quality criteria and the methodology for calculating the quality index.

A further distinction in the Folz regression equation is that it is strictly linear. His research was restricted to 31 cities in Tennessee with populations ranging between 10,000 and 55,000, to specifically eliminate differences of economies of scale between municipalities.

Folz divided the cities into two quality of service categories. Cities which had a relative service quality index score greater than 700 points were classified as high quality cities and cities which had a score less than 700 were classified as moderate quality cities. Regression equations were computed for each group. The classification of the cities into different service groups and a separate regression equation for each group helped to minimize the error that may be associated with the proxy measures of service quality. The final regression equations developed by Folz are as follows:

For High Quality Cities:

$$E = -1{,}339{,}822.76 + \underset{(4.890)}{246.589W} - \underset{(-0.619)}{149.067C} + \underset{(0.937)}{3{,}878.305Q}$$

For Moderate Quality Cities:

$$E = 3{,}357{,}992.82 + \underset{(7.903)}{286.291W} - \underset{(-1.017)}{32.782C} - \underset{(-0.211)}{967.740Q}$$

TABLE 5

THE RELATIVE SERVICE QUALITY INDEX

SERVICE	QUALITY CRITERIA	METHOD FOR CALCULATING SERVICE QUALITY VALUES
1. Police	1983 FBl Crime Index	Cities are classified by metro status and by population. The mean crime index figure for cities in each category is calculated and assigned a value of 100 points. The percentage difference of each city's crime index from the mean in each category is calculated and added to or subtracted from the 100 points.
2. Fire Protection	1983 fire protection classification, based on the ratings of the Insurance Services Offices of Tennessee	Class: 3 — Point Value: 200 4 — 150 5 — 100 6 — 50
3. Refuse Collection	Frequency and point of collection for residential refuse collection (add 25 points for any special services provided)	Type: 2/Wk., backdoor — Point Value: 200 2/Wk., curb/alley — 150 1/Wk., backdoor — 100 1/Wk., curb/alley — 50
4. Street Maintenance	Percentage of city street miles rated in poor condition or in need of resurfacing	Category: 0-10% — Point Value: 200 10-19% — 150 20-29% — 100 30% or more — 50

TABLE 5 -- CONTINUED.

SERVICE	QUALITY CRITERIA	METHOD FOR CALCULATING SERVICE QUALITY VALUES
5. Parks and Recreation	Number of tennis courts per 2,000 population Number of lighted tennis courts per 5,000 population Number of baseball/ softball fields per 3,000 population	The three national standards are assigned a value of 33 points each. Each city's percentage deviation from the national standards is multiplied by 33 points, and the sum of the three scores are assigned quality point values, so that the weight of the parks and recreation service will be equivalent to to the five other services in the study Score — Point Value 300+ — 200 250-299 — 175 200-249 — 150 150-199 — 125 100-149 — 100 50-99 — 75 26-49 — 50 0-25 — 25
6. Financial Admin.	Moody's rating of municipal general obligation debt	A1 — 150 A — 100 Baa1 — 75 Baa — 50 Ba — 25
	Receipt of MFOA certificate of conformance for financial reporting	Yes — 50

Source: David H. Folz, "Municipal Productivity and Service Quality: A Regression Based Fiscal Analysis," Ph.D. dissertation, University of Tennessee, August 1985, pp. 111-112.

where E, W and C are as stated in the Ammons equation, except the cost index has been modified slightly to include the position of Street Supervisor. Q is the service quality score as measured from the relative service quality index as illustrated in Table 5 (Folz 1985).

The R squared values for the above regression equations were .7444 for the high quality service cities and .8888 for the moderate quality service cities. The t statistics shown below the parameter estimates indicate even a greater weakness over the previous equation proposed by Ammons. Again, consideration of this weakness will be deferred until the next chapter.

Regression models as those developed above, weaknesses not withstanding, provide some measure of inter-city productivity comparison, given the community's population, local factor prices and service quality. In turn, comparisons can be made of the community's proficiency in the efficient delivery of its services to its citizens.

In an effort to identify the factors which make one city more productive than another city, both Ammons and Folz looked at a number of organizational and community characteristics to determine if there was a correlation between such characteristics and the relative productivity index. The characteristics examined were divided into

broad categories to include chief executive characteristics, organizational characteristics, management factors, organizational priorities, financial factors, characteristics of the city council, citizen participation and overall community characteristics. Appendix A of this report lists all individual characteristics which were found to be statistically significant at the .1 level or better.

After additional analyses of the relationship between the relative productivity index and the associated characteristics, both Ammons and Folz reached similar conclusions. Namely, municipalities which are relatively more productive than other municipalities with similar service deliveries in scope and quality tend to use a consulting management style and allow for employee involvement. Also, cities that had a higher percentage of their revenues derived from local sources, and a correspondingly lower dependence on outside revenues, tended to be more productive (Ammons 1984; Folz 1985).

Although the equations developed by Ammons and Folz are statistically flawed, they appear logical and appealing on an intuitive basis. The next chapter of the report presents an effort to improve upon this logic and to create a statistically significant model in regards to the relationship between a municipality's expenditure in

relation to its work load as determined by population, its costs as determined by the cost index and its service quality as determined by the quality parameter developed by Folz.

VI. INTER-CITY PRODUCTIVITY COMPARISONS: NEW AND IMPROVED

The work by Ammons and Folz promotes a new methodology for making inter-jurisdictional productivity comparisons given the previously discussed difficulties of relating such performance measures as efficiency, quality and effectiveness. However, the proposed regression models are statistically flawed and, in addition, there are limitations on the applicability of the models. Ammon's model is limited in application to cities of high quality service delivery, but on the other hand, the Folz's models are limited to cities of a narrow population range.

Despite the statistical flaws, the logic behind the methodology has intuitive appeal and warrants further consideration. This chapter will demonstrate improvements to the models proposed by Ammons and Folz and then will be used to evaluate the performance of several Central Florida cities.

To overcome the described shortcomings, the author collected the raw data from both researchers and then adjusted the data into a common data base. The data transformation consisted primarily of converting the Ammons data to a comparable base with the Folz data.

Ammons' data were collected in 1980, whereas Folz's data were collected in 1983. Furthermore, there were different categories used in the data collection which also had to be adjusted. An explanation of the transformation methodology is provided in Appendix B and the total adjusted data, representing the efforts of Ammons, Folz and the author, are presented in Appendix C of this report.

In addition to merging the data base from the previous researchers, the author also obtained the requisite raw data by personal and telephone interviews of various city representatives for four Central Florida cities: Altamonte Springs, Orlando, Sanford and Winter Park. Table 6A lists the values of the service quality indicators, as previously described by Folz in Table 5, for the four cities. These service quality indicator values were then used to compute the relative service quality index for each of the four cities which are listed in the bottom half of Table 6. The data sets for the Central Florida cities shown in Table 7 are from 1985; however, they were adjusted in a similar fashion to the Ammons data. It should be noted that the expenditures are the average of fiscal years 1984 and 1985, which helps to reduce a single year expenditure anomaly.

The author developed a set of quality variables which distinguished classifications of quality rather than an absolute numeric quantity. Folz's service quality indicator

TABLE 6A

SERVICE QUALITY INDICATOR VALUES

	ALTAMONTE SPRINGS	ORLANDO	SANFORD	WINTER PARK
1985 FBI INDEX	8,290.8	11,351.5	9,545.1	7,216.1
ISO RATING	4	3	5	4
REF.COLL.	2/WK CURB	2/WK CURB	2/WK CURB	2/WK CURB
STREETS	8.5%	11%	11.5%	20%
# TENNIS CTS. PER 2,000	.5376	.4929	1.0822	1.5679
# LIT TENNIS CTS. PER 5,000	1.344	1.2322	1.0822	3.3007
# BALL FLDS. PER 3,000	.9216	.4436	.7575	1.2378
FINANCIAL				
MOODY'S RATING	A	A	Baa	A
RECEIPT OF MFOA	YES	YES	NO	YES

TABLE 6B

SCORES OF THE RELATIVE SERVICE QUALITY INDEX

CITY	POLICE	FIRE	REFUSE	STREET	PARKS	FINANCE	TOTAL
A.S.	110	150	150	200	75	100+50	835
ORL.	77	200	150	150	75	100+50	802
SANFORD	95	100	150	150	75	50+ 0	620
W.P	126	150	150	100	150	100+50	826

Source: Compiled by author.

TABLE 7

REQUISITE DATA FROM FOUR CENTRAL FLORIDA CITIES

	ALTAMONTE SPRINGS	ORLANDO	SANFORD	WINTER PARK
EXPENDITURES				
ADMIN.	1,031,122	2,528,703	1,520,106	480,497
FIRE	1,910,718	15,409,167	1,418,072	1,582,449
POLICE	2,509,440	22,603,313	2,236,132	2,962,002
STREETS	787,478	5,020,206	1,421,764	842,188
REFUSE	537,952	8,026,272	792,512	943,398
PARKS	832,640	4,805,663	766,276	1,601,286
TOTAL	7,609,450	58,393,324	8,154,862	8,411,820
POPULATION	26,041	142,025	27,721	24,237
SALARY INDEX				
POLICE OFF.	16,476	16,920	17,464	16,452
FIREFIGHTER	16,476	18,837	17,464	14,268
CL. TYPIST	11,196	11,586	11,096	9,588
STR. SUPER.	20,063	23,000	19,213	16,452
AVERAGE	16,053	17,586	16,309	14,190
QUALITY INDEX	835	802	620	826

Source: Compiled by author.

values were categorized into low, medium and high services instead of the categories of moderate and high as originally proposed. The category divisions were as follows:

Classification	Range of Folz's Quality Index	Values of the Classification Variables	
		Q1	Q2
Low Quality	0 - 699	0	0
Medium Quality	700 - 999	0	1
High Quality	1000 - 1200	1	0

The classification of the quality indicator variables was used because the original data only provided enough information to categorize the Ammons cities as high quality in relation to the Folz cities. Moreover, the quality variable used as a continuous variable proposed by Folz exhibited weakness. Finally, the division into three categories of the quality indicator appeared logical based on the raw data available.

A number of models were tested using the data presented in Appendix C. Several of the observations were identified as being influential in the regression relation and these were removed from the data set. After removal of the influential observations, a satisfactory model could not be identified. Further deliberation led to several explanations to account for the problem. First, it was suspected that the quality criteria proposed by Folz was not an appropriate measure of quality for all of the municipal services. For example, the use of the FBI Crime Index likely does not accurately reflect the quality of police services since there could be a number of other factors affecting the index. Conversely, a city which enjoys a low crime index may not provide quality or productive service. Next, the relationship between quality and productivity can be either direct or inverse depending

upon the particular municipal service in question. Therefore, the use of a single variable to relate quality to expenditure will not accurately depict the relationship between quality and productivity when aggregating a number of municipal services into a single measure. Finally, other explanatory variables may be relevant to one municipal service and not to another or to one city and not to another. This is evident in the case of street maintenance where the winter season can cause a large increase in expenditures for northern cities.

In view of these specification errors, it was decided to examine the individual services of recreation and refuse collection. The expenditures for these services were reported separately in the original data of Ammons and Folz, so they could be analyzed individually. These expenditures were adjusted in a similar manner as before and are listed in Appendix D.

The recreation service was examined first. The quality of service indicator developed by Folz for recreation was considered appropriate, since it did not appear to contain the possible errors previously described. The quality values were again classified into low, 75 points and less; medium, 100 through 150 points and high, 175 points and greater. As before, a number of models were tested and the influential observations were dropped from

the analyses. The following equation provided the best fit of the retained observations:

$$E = \underset{}{-0.94106} + \underset{(5.892)}{0.03209W} - \underset{(-3.368)}{0.0001736W^2} + \underset{(1.805)}{0.000048C}$$

$$+ \underset{(4.938)}{0.1919Q1} + 0.2197Q2$$

where E is the city's expenditure for recreation in millions of dollars, W is the population in thousands, C is the cost in dollars and Q1, Q2 are the quality classification variables as previously described. The t statistic values are shown below the parameter coefficients, except the F statistic value is shown for Q1 and Q2. Since these variables are classification variables the F statistic was used to test the null hypothesis that there is not a significant relationship between them jointly and the dependent variable. The test statistic values indicate all of the explanatory variables are significant and the adjusted R squared value of the model is .834.

Refuse collection was examined next. As in the case of recreation, it was felt that Folz's quality of service indicator was appropriate for this particular service. However, for the refuse collection, Ammon's data was sufficient to assign a point value to the service quality indicator proposed by Folz, and it became apparent that it could stand alone as a significant explanatory variable and

did not need to function as a classification variable. The reader is referred to Appendix D for the point values. After deleting the influential observations, the following model was developed:

$$E = -0.097025 + \underset{(18.524)}{0.0208\ W} + \underset{(3.143)}{.001212Q}$$

where E and W are the same as in recreation and Q is the explanatory variable described above. Again, the t statistics are shown below the parameter estimates and the adjusted R squared value for the model is .926. It should be noted in the case of refuse collection the cost factor, C, did not show to be significant in regard to expenditures nor was there a significance in the economics of scale as represented by the quadratic form of the workload variable.

The equations developed for both services indicate that the previous explanations for model weaknesses are valid. They also indicate that the variety of individual municipal services make a single performance measure nearly impossible. Finally, the models represent a major improvement over the previous models developed by Ammons and Folz because the dependent variables are statistically significant and, also, they are more adaptive than the previous models.

The new models were used to compare differences in service delivery based on per capita expenditure and the

relative productivity index for the remaining cities for each service. These comparisons are shown in Tables 8A and 8B. It is noted many of the cities realized a major change in their rank when evaluated against the relative productivity index, while other cities saw little or no change. The significant point is that the relative productivity index accounts for service quality differences in the expenditure pattern for the subject service and, therefore, it provides a better picture of the true productivity differences between cities.

The use of the adjusted data undoubtedly introduced additional error into the models and, hence, improvements would likely be realized with better data. Nonetheless, the models are statistically significant and provide a new tool to managers who desire to evaluate the performance of their organization in relationship to other organizations. Furthermore, the new models allow comparisons between cities of different mix in both population and quality of service. Finally the models illustrate the importance of considering the quality of a municipal service when one is attempting to measure the productivity of the municipality; thereby, validating the definition of productivity as proposed by Hayward in Chapter I of this paper.

TABLE 8A

PER CAPITA EXPENDITURE VERSUS RPI
RANKING FOR RECREATION

CITY	RANK BASED ON $/CAPITA	RANK BASED ON THE RPI
Millington, TN	1	2
Franklin, TN	2	3
Red Bark, TN	3	7
Cookeville, TN	4	5
Lebanon, TN	5	4
Union City, TN	6	15
Maryville, TN	7	16
Humbolt, TN	8	6
Hendersonville, TN	9	12
Bristol, TN	10	11
Roanoke, VA	11	22
Gallatin, TN	12	8
Athens, TN	13	1
Gainsville, FL	14	18
Columbia, TN	15	10
Mufreesboro, TN	16	14
Shelbyville, TN	17	9
Chapel Hill, NC	18	17
Elizabethton, TN	19	31
Greenville, TN	20	21
McMinnville, TN	21	19
Springfield, TN	22	29
Richardson, TX	23	23
Cleveland, TN	24	13
Paris, TN	25	38
Upper Arlington, OH	26	20
Owensboro, KY	27	26
Bartlett, TN	28	33
Jackson, TN	29	24
Morristown, TN	30	25
Lawrenceburg, TN	31	32
Ft. Walton Beach, FL	32	30
Johnson City, TN	33	28
Germantown, TN	34	27
Sanford, FL	35	34
Altamonte Springs, FL	36	35
Dyersburg, TN	37	36
Tullahoma, TN	38	37

Source: Compiled by author.

TABLE 8B

PER CAPITA EXPENDITURE VERSUS
RPI RANKING FOR REFUSE COLLECTION

CITY	RANK BASED ON $/CAPITA	RANK BASED ON THE RPI
Bristol, TN	1	2
Cookeville, TN	2	4
Shelbyville, TN	3	1
Athens, TN	4	7
Maryville, TN	5	6
Red Bank, TN	6	3
Springfield, TN	7	5
Elizabethton, TN	8	22
Morristown, TN	9	8
Cleveland, TN	10	18
Roanoke, VA	11	15
Altamonte Springs, FL	12	12
Oakridge, TN	13	9
Johnson City, TN	14	26
Chapel Hill, NC	15	11
Richardson, TX	16	16
Germantown, TN	17	10
Bartlett, TN	18	21
Lebanon, TN	19	19
Kingsport, TN	20	29
Columbia, TN	21	23
Mufreesboro, TN	22	17
Hendersonville, TN	23	14
Hunbolt, TN	24	28
Upper Arlington, OH	25	24
Paris, TN	26	30
Lake Forest, IL	27	13
McMinnville, TN	28	20
Ft. Walton Beach, FL	29	27
Sanford, FL	30	32
Dyersburg, TN	31	25
Lawrenceburg, TN	32	35
Tullahoma, TN	33	33
Winter Park, FL	34	34
Union City, TN	35	31

Source: Compiled by author.

VII. CONCLUSIONS

The primary purpose of this research effort has been to set forth productivity issues for local government when managers are considering the implementation of a productivity measurement and improvement effort. Many municipalities are approaching a state of fiscal stress due to the rebellion against increasing local taxes and the dwindling federal revenue received by local jurisdictions, while at the same time demands for municipal services are continuing to increase. This developing scenario has lead to recent interest in municipal productivity; however, to the casual observer, there is a great deal of ambiguity and conflicting opinions on this subject. On another front, the continuing growth of the public sector expenditures in relation to the gross national product increases the importance of the public service productivity role in making the U.S. more competitive in the world market place. As a result, there is increasing pressure for the public sector to adopt sound business practices, believing that doing so will achieve the objective of increasing productivity. The public manager can undoubtedly learn some from the private sector area; however, the public

sector has a great deal of unique forces and situations which must also be considered by the public manager.

One such unique aspect of productivity in the public sector is the relationship of service quality and effectiveness to productivity. In the public sector, the relationship between quality and productivity in service delivery is frequently inverse, whereas in the private sector it is a direct relationship. Another unique feature of the public sector is the non-exclusionary nature of its services. Since public services are available to everyone, the true or absolute effectiveness and utilization of a particular service is likely to be unknown. Furthermore, it is unrealistic to attempt to quantify the value of many services provided by local government.

There are other measurement problems in determining public sector productivity. In addition to the inability to measure certain services, services and inputs which are measured are generally done so on an individual basis from jurisdiction to jurisdiction. There results a lack in common format reporting, making inter-jurisdictional comparisons difficult. Additionally, a single measure has not been developed which can adequately account for differences in service quality and delivery effectiveness in addition to efficiency.

In an effort to overcome these difficulties and

respond to the need for municipal productivity measurement and improvement, a number of techniques have been developed and others are continuing to emerge. There is no single technique which will provide a panacea for the municipal manager and the manager must selectivity match the technique to the needs of the particular jurisdiction. Recent study, however, on public sector productivity has indicated several prerequisites for the success of a productivity improvement effort. The organization must have the necessary staff which is capable of the analytical procedures and there must be solid support from top management of the productivity effort. In this regard, a clear rationale must be in place and communicated to all individuals within the organization as to the motives of the program. Finally, some type of measurement system must be developed to track performance. This task presents a good opportunity to provide for employee participation in the improvement program which in turn will help create an open and trusting relationship throughout the organization.

For the manager who is interested in examining inter-city productivity, the technique presented in Chapter VI may be useful. Furthermore, the work done by Ammons and Folz has identified a relationship between productivity enhancement and various organizational, management, financial and community characteristics.

The research performed in the area of public sector productivity is rather minimal when compared to the effort expended in the private sector and certainly much more research effort is warranted. There is a need for uniform data collection practices to promote future studies of inter-city productivity. Organizations such as the International City Management Association or the National League of Cities could be instrumental in developing and promoting the standardization of municipal data collection practices.

Future studies of inter-city productivity should include refinements to the work done by Ammons and Folz and the models presented in Chapter VI. The inclusion of another independent variable in the regression equation which would serve as an indicator of citizen satisfaction and utilization of the service would be helpful in determining the effectiveness dimension of the service. Finally, additional studies of intra-organizational productivity would provide information to help evaluate the success of various service innovations and management techniques within a jurisdiction.

APPENDIX A

SIGNIFICANT RELATIONSHIPS BETWEEN EXPLANATORY VARIABLES AND THE RELATIVE PRODUCTIVITY INDEX

TABLE 9

CORRELATION COEFFICIENTS BETWEEN PRINCIPAL EXPLANATORY VARIABLES AND THE RELATIVE PRODUCTIVITY INDICES FOR HIGH QUALITY SERVICE CITIES BY FOLZ

VARIABLE	N	r
Characteristics of CEO's, Local Elected Representatives, and Department Heads:		
Percentage of City Council Members with Five-Ten Years Tenure	10	.542**
Average Educational Level of Department Heads	11	-.484*
Organizational Priorities:		
Street Maintenance	14	-.562**
Economic Development	14	.543**
Public Safety	14	-.427*
Organizational Characteristics:		
Character of Control Process	11	-.675**
Extent of Cooperative Teamwork	11	-.619**
Accuracy of Upward Communications	11	-.597**
Management Factors:		
Use of Task Systems	14	-.509**
Service Privatization Score	14	.445**
Use of Educational Incentives	14	-.409*
Use of Attendance Incentives	14	-.395*
Flexibility to Reward Employees for Exceptional Performance	14	-.388*
Use of Suggestion Awards	14	-.373*
Financial Characteristics:		
Total Revenue Per Capita	14	-.485**
Total Intergovernmental Revenue Per Capita	14	-.478**
Per Capital Local Sales Tax Revenue	14	-.456**
Community Characteristics:		
Rate of Population Change Between 1970-1980	14	.532**

TABLE 9 -- CONTINUED.

VARIABLE	N	r
Percentage of the City Population Under 18 Years of Age in 1980	14	.499**
Percentage of the City Population 65 Years of Age and Older in 1980	14	.359*

r = Pearson product-moment correlation

* Statistically significant at the .10 level (one-tailed test)

** Statistically significant at the .05 level (one-tailed test)

Source: David H. Folz, "Municipal Productivity and Service Quuality: A Regression Based Fiscal Analysis," Ph.D. dissertation, University of Tennessee, August 1985, p. 186.

TABLE 10

CORRELATION COEFFICIENTS BETWEEN PRINCIPAL EXPLANATORY VARIABLES AND THE RELATIVE PRODUCTIVITY INDICES FOR MODERATE QUALITY SERVICE CITIES BY FOLZ

VARIABLE	N	r
Characteristics of CEO's, Local Elected Representatives, and Department Heads:		
Percentage of City Council Members with Five-Ten Years Tenure	14	-.676**
Percentage of City Council Members with Less Than Five Years Tenure	14	.573**
Tenure of Mayor (in Years)	14	-.546**
Average Educational Level of Department Heads	14	.484**
Percentage of City Council Members with a High School Education	14	-.483**
Percentage of City Council Members with a College Education	14	.482**
Mayor's Formal Education Level	17	-.452**
Percentage of City Council Members with Blue-Collar Skilled or Semi-Skilled Occupations	14	.427*
Percentage of City Council Members with Small Business, Sales, Teaching or Clerk Occupations	14	-.372*
Organizational Priorities:		
No significant correlations		

TABLE 10 -- CONTINUED.

VARIABLE	N	r
Organizational Characteristics:		
Extent to Which Leaders Have Confidence and Trust in Subordinates	14	-.518**
Character of Control Process	14	-.493**
Extent of Motivation through Rewards Rather than Punishment	14	-.472**
Management Factors:		
Use of Suggestion Incentives	14	-.610**
Flexibility to Reward Employees Exceptional Performance	14	-.491**
Use of Job Enrichment Techniques	14	-.486**
Use of Variation in Working Hours	14	-.396*
Financial Characteristics:		
Total Revenue Per Capita	17	-.485**
Community Characteristics:		
Percentage of the City Population 65 Years of Age and Older in 1980	17	-.626**
Age of the City Since Incorporation	17	-.625**
Percentage of the Work Force in Wholesale and Retail Trade Occupations in 1980	17	.508**
Density (Population per Square Mile in 1982)	17	.502**
Percentage of Population with at Least a High School Education	17	.483**
Percentage of Work Force in Industrial Manufacturing Occupations	17	-.437**

TABLE 10 -- CONTINUED.

VARIABLE	N	r
Percentage of Housing Stock Owner - Occupied in 1980	17	.362*
Percentage Work Force in Service-Related Occupations	17	.334*

r = Pearson product-moment correlation
* Statistically significant at the .10 level (one-tailed test)
** Statistically significant at the .05 level (one-tailed test)

Source: David H. Folz, "Municipal Productivity and Service Quality: Regression Based Fiscal Analysis," Ph.D. dissertation, University of Tennessee, August, 1985, pp. 187-188.

TABLE 11

COEFFICIENTS OF CORRELATION BETWEEN RELATIVE PRODUCTIVITY AND PRINCIPAL EXPLANATORY VARIABLES BY AMMONS

VARIABLE	N	r
Ratio of property and sales tax revenues to total general revenues	14	.655***
Reformism index	14	-.650***
Availability of one-time bonuses for managerial performance	14	.637***
Balanced practice of promoting city managers from within and hiring from outside the organization	14	.605***
Extent of contracting for legal services	14	.597***
Extent to which the use of control data (accounting, productivity, and so forth) for self-guidance or group problem solving rather than for punishment is emphasized or perceived as a relative strength	14	.596***
Amount of perceived cooperative teamwork present	14	-.581***
Ratio of property tax revenues to total general revenues	14	.557***
Ratio of general obligation debt service to total general revenues	14	.552***
Percentage of 1970 housing constructed since 1960	12	.538**
Ratio of intergovernmental revenues to property tax revenues	14	-.501**
Extent to which confidence in subordinates is emphasized or perceived as a relative strength	14	.493**

TABLE 11 -- CONTINUED.

VARIABLE	N	r
Ratio of adjusted general obligation debt service to total general revenues	14	.484**
Number of ad hoc advisory groups appointed by city council in a typical year	14	-.481**
All-America City recognition	14	-.470**
Federal presence	11	-.469*
Extent to which behavioral approaches to productivity improvement are emphasized over industrial-engineering approaches	11	.454*
Use of volunteers in the police department	14	-.437*
Reformism, nonpartisan elections	14	-.435*
Employment of an ICMA Management Innovation Award recipient	14	-.435*
Ratio of sales tax revenues to total general revenues	14	.426*
Extent to which information perceived to flow up and with peers, as well as downward	14	-.426*
Deviation of city-manager salary from average salary index for selected employee classifications in same city	12	-.421*
Population per square mile, 1975	12	-.417*
Property and sales tax revenues per capita	14	.415*
Number of permanent citizen boards and commissions per 10,000 population	14	.409*

TABLE 11 -- CONTINUED.

VARIABLE	N	r
Extent to which information flows upward and with peers, as well as downward, is emphasized or perceived as a relative strength	14	-.409*
Reformism, at-large elections	14	-.401*
Percentage population change from 1970 to 1980	14	.393*
Emphasis upon labor relations as a high-priority issue	14	-.392*
Use of task system for public works department employees	14	.386*
Percentage of department heads with high school diploma but no college	14	-.383*
Use of task system for "other" employees	14	-.382*
Contracting for legal services	14	.373*
Sales tax revenues per capita	14	.372*
Occupation level of council members	14	.367*

r = Pearson product-moment correlation
* Statistically significant at the .10 level (one-tailed test)
** Statistically significant at the .05 level (one-tailed test)
*** Statistically significant at the .025 level (one-tailed test)

Source: David N. Ammons, Municipal Productivity: A Comparison of Fourteen High-Quality-Service Cities, New York: Praeger Publishers, 1984, pp. 206-208.

APPENDIX B

DESCRIPTION OF THE VARIABLE TRANSFORMATION METHODOLOGY

DESCRIPTION OF THE VARIABLE TRANSFORMATION METHODOLOGY

In order to combine the data collected by Ammons with the data collected by Folz to create a single data base, adjustments were made to the Ammons' data. First, monetary values were transformed from base year 1980 to base year 1983 using the Municipal Cost Index as published by the American City and County magazine. Next, the work load or population was adjusted utilizing the population figures printed by the U.S. Department of Justice, Federal Bureau Investigation in the Uniform Crime Report for the U.S., 1983.

Ammons' research limited his cities to high quality service cities, whereas Folz developed a quality service index to distinguish between different levels of quality. The data base of the two researchers contained a common city which both researchers considered high quality. Therefore, all of the Ammons' cities were assigned to high quality designation.

Both researchers also utilized different positions for the salary index and different operating divisions for the expenditure criteria. To accommodate these differences in reporting, the author first standardized the data based on the municipal cost index and the remaining differences were identified. Percentages of increase or decrease were then

computed based on the different categories and a corresponding compensating adjustment was made to the data base. For example, Ammons did not include the position of Street Supervisor in his data base. The adjustment therefore, included not only an adjustment for the inflationary factor from 1980 to 1983 but a subsequent adjustment for the increase represented by the additional position of Street Supervisor in the Folz data.

APPENDIX C

SUMMARY OF ADJUSTED DATA COLLECTED BY AMMONS, FOLZ AND AUTHOR

TABLE 12

SUMMARY OF ADJUSTED DATA COLLECTED
BY AMMONS, FOLZ AND AUTHOR

CITY	EXPENDITURE $OOO,OOOs	POPULATION OOOs	COST $s	QUALITY L M H
Sunnyvale, CA	26.19083000	113.784	21032	High
Ft Walton Bch, FL	4.84388000	23.232	11828	High
Gainesville, FL	18.22423700	80.677	13662	High
St Petersburg, FL	57.72070300	260.697	14004	High
Lake Forest, IL	5.41693900	15.290	18679	High
Owensboro, KY	10.82741800	54.910	13201	High
Chapel Hill, NC	5.58711000	31.935	12275	High
Greensboro, NC	36.29729200	61.200	13833	High
Upper Arlington, OH	8.66204100	35.555	12976	High
Austin, TX	78.03476300	381.091	15187	High
Richardson, TX	11.74179800	80.273	16760	High
Newport News, VA	24.53578100	150.974	12203	High
Roanoke, VA	22.65120000	103.919	13021	High
Germantown, TN	6.48930100	22.750	14313	High
Oak Ridge, TN	6.75020500	27.662	18764	High
Union City, TN	2.68217900	10.516	11335	Medium
Shelbyville, TN	2.53489500	13.530	14334	Medium
Morristown, TN	5.53769000	19.962	13036	Medium
Springfield, TN	1.91236000	10.814	11691	Medium
Columbia, TN	5.12460300	26.571	12219	Medium
Kingsport, TN	9.87615900	32.027	12309	Medium
Dyersburg, TN	3.63049300	15.856	11745	Medium
Tullahoma, TN	4.50012700	15.800	11442	Medium
Hendersonville, TN	3.67481500	26.805	13167	Medium
Gallatin, TN	3.84610600	17.191	13520	Medium
Lawrenceburg, TN	2.59774200	10.184	12956	Medium
Paris, TN	2.75060900	10.728	13538	Medium
Mufreesboro, TN	6.42999100	32.845	15460	Low
Johnson City, TN	12.15872000	43.522	13825	Low
Jackson, TN	12.20528300	49.131	14787	Low
Greenville, TN	3.12118300	14.097	11982	Low
Elizabethton, TN	2.61525300	12.460	11398	Low
Millington, TN	1.81988700	20.236	12396	Low
Bristol, TN	3.78062300	23.986	14433	Low
Bartlett, TN	3.83131200	18.618	12658	Low
Maryville, TN	5.80806800	17.807	12879	Low
Cleveland, TN	5.19483700	26.652	13882	Low
Lebanon, TN	2.52880400	12.275	13508	Low

TABLE 12 -- CONTINUED.

CITY	EXPENDITURE $OOO,OOOS	POPULATION OOOs	COST $s	QUALITY L M H
McMinnville, TN	2.15419300	10.683	13142	Low
Red Bank, TN	1.67304600	13.299	13218	Low
Franklin, TN	2.48690500	13.183	15197	Low
Humbolt, TN	1.70543100	10.209	12798	Low
Athens, TN	3.05413000	12.080	12028	Low
Cookeville, TN	4.12695900	20.794	13566	Low
Orlando, FL	56.67656000	142.678	17069	Medium
Altamonte Spgs, FL	7.38573200	23.993	15581	Medium
Winter Park, FL	8.16451200	24.915	13773	Medium
Sanford, FL	7.91510900	23.131	15830	Low

Sources: For Tennessee Cities; David H. Folz, "Municipal Productivity and Service Quality: A Regression Based Fiscal Analysis," Ph.D. dissertation, University of Tennessee, August 1985.
Compiled by author for Orlando, Altamonte Springs, Winter Park and Sanford, FL.
For remaining cities, David N. Ammons, Municipal Productivity: A Comparison of Fourteen High Quality Service Cities, New York: Praeger Publishers, 1984, data adjusted by author.

APPENDIX D

DATA FOR RECREATION AND REFUSE COLLECTION SERVICES

TABLE 13

DATA FOR RECREATION AND REFUSE COLLECTION SERVICES

CITY	REFUSE EXPENSE $s	REFUSE QUALITY POINTS	RECREATION EXPENSE $s	RECREATION QUALITY L M H
Sunnyvale, CA	3,846,745	200	4,273,175	High
Ft Walton Bch, FL	721,107	200	629,023	High
Gainesville, FL	2,166,521	200	1,163,540	High
St Pete, FL	11,242,970	200	6,029,937	High
Lake Forest, IL	439,490	200	946,303	High
Owensboro, KY	2,117,444	200	1,226,683	High
Chapel Hill, NC	716,266	200	557,255	High
Greensboro, NC	3,353,000	200	4,579,054	High
Upper Arlington, OH	973,645	200	752,805	High
Austin, TX	4,909,319	200	11,268,020	High
Richardson, TX	1,831,299	200	1,578,912	High
Newport News, VA	3,485,002	200	2,568,312	High
Roanoke, VA	2,253,365	200	1,369,954	High
Germantown, TN	529,370	200	692,619	Medium
Oak Ridge, TN	605,433	200	512,986	High
Union City, TN	398,662	150	88,579	High
Shelbyville, TN	174,946	150	225,500	High
Morristown, TN	386,683	150	506,813	Medium
Springfield, TN	203,864	150	212,524	Medium
Columbia, TN	625,164	100	416,659	Medium
Kingsport, TN	752,913	50	1,211,229	Medium
Dyersburg, TN	528,523	200	569,082	Medium
Tullahoma, TN	564,453	150	591,872	Medium
Hendersonville, TN	669,390	200	327,481	Low
Gallatin, TN	788,936	75	237,080	Medium
Lawrenceburg, TN	343,215	75	274,419	High
Paris, TN	305,780	100	219,375	Low
Mufreesboro, TN	779,596	150	523,295	Low
Johnson City, TN	967,484	50	1,255,002	Medium
Jackson, TN	2,166,640	200	1,203,427	Medium
Greenville, TN	872,875	50	258,473	Medium
Elizabethton, TN	237,234	50	228,370	High
Millington, TN	215,843	200	36,411	Low
Bristol, TN	224,765	50	315,588	Low
Bartlett, TN	434,322	100	257,996	Medium
Maryville, TN	254,928	75	153,227	Low
Cleveland, TN	561,108	75	527,087	Medium
Lebanon, TN	288,132	100	66,259	Medium
McMinnville, TN	320,264	150	204,446	Medium

TABLE 13 -- CONTINUED.

CITY	REFUSE EXPENSE $s	REFUSE QUALITY POINTS	RECREATION EXPENSE $s	RECREATION QUALITY L M H
Red Bank, TN	214,570	150	48,181	Low
Franklin, TN	704,202	100	36,600	Low
Humbolt, TN	272,697	100	108,641	Medium
Atnens, TN	160,412	50	173,771	Low
Cookeville, TN	256,038	50	103,000	Low
Orlando, FL	7,790,300	150	4,664,377	Low
Altamonte Spgs, FL	522,136	150	808,160	Low
Winter Park, FL	915,662	150	1,554,208	Medium
Sanford, FL	769,212	150	743,747	Low

Sources: For Tennessee Cities; David H. Folz, "Municipal Productivity and Service Quality: A Regresstion Based Fiscal Analysis," Ph.D. dissertation, University of Tennessee, August 1985.
Compiled by author for Orlando, Altamonte Springs, Winter Park and Sanford, FL.
For remaining cities, David N. Ammons, Municipal Productivity: A Comparison of Fourteen High Quality Service Cities, New York: Praeger Publishers, 1984, data adjusted by author.

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